

W. H. ECCLES, D.Sc., F.R.S.

President 1928-1929

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OF
THE PHYSICAL SOCIETY

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PROCEEDINGS AT THE MEETINGS OF THE PHYSICAL SOCIETY

SESSION 1928-1929

except where the contrary is stated, the meetings were held at the Imperial College of Science and Technology, South Kensington.

October 26, 1928.

W. H. ECCLES, D.Sc., F.R.S., and subsequently R. W. PAUL, in the Chair.

1. A paper entitled, "An Experimental Study of the Anticlastic Bending of Rectangular Bars of Different Cross-Sections," by ALLAN FERGUSON, M.A., D.Sc., and JAS. P. ANDREWS, M.Sc., was read by Mr Andrews.
2. A paper entitled, "An Instrument for the Production of Known Small High-frequency Alternating Electromotive Forces," by B. S. SMITH, A.M.I.E.E., Inst.P., and F. D. SMITH, M.Sc., A.M.I.E.E., was read by Mr F. D. Smith.
3. A demonstration of a New Device for Thermostatic Control was given by F. T. JARVIS, B.Sc., Birkbeck College.

November 9, 1928.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following were elected Fellows of the Physical Society: Har Chand Singh, Arthur Ernest Bate, Stanley Whitehead, Satyendra Ray, Louis Cohen, Dorothy Lilian Tilleard, Rupert Henry Saunders, Horace Pearson Walmsley. The President announced that the Council had elected the following Student members of the Society: Leslie Charles Bailey, Reginald Frederick Clark, Arthur William Carter, Morris Lazarus Savronsky, Sidney John Kennedy, Leonard Francis Osmond, Harry James Shepherd, John Guyscliffe Holmes, Basil Gordon Jenkins, Wilfrid Basil Mann.
2. A paper entitled, "The Effect of Moist Air on the Resistance of Pencil Lines," by J. B. SETH, M.A., CHETAN ANAND, M.A., and GIAN CHAND, M.Sc., was read by Dr Allan Ferguson in the absence of the authors.
3. A paper entitled, "An Absolute Current-balance having a Simple Approximate Theory," by L. F. RICHARDSON, D.Sc., F.R.S., V. STANYON, B.Sc., and other students of Westminster Training College was read by Dr Richardson, and a demonstration of the apparatus described was given by Messrs V. STANYON, B.Sc., and G. W. ROE, B.Sc.
4. A paper entitled, "Notes on Wireless Methods of Investigating the Electrical Structure of the Upper Atmosphere," was read by E. V. APPLETON, F.R.S.

November 23, 1928.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following were elected Fellows of the Physical Society: Leslie Martin Clark, Joseph Parker Manickasingham, C. A. Luxford.

The President announced that the Council had elected the following Student Members of the Society: Sidney Jefferson, Ronald Curry.

2. A paper entitled, "The Effect of Superimposed Magnetic Fields on Dielectric Losses and Electric Breakdown Strength," by ALLAN MONKHOUSE, M.I.E.E., A.M.I.Mech.E., was taken as read, in the absence of the author.

3. A paper entitled, "A New A.C. Potentiometer of Larsen Type," was read by ALBERT CAMPBELL, M.A.

4. A paper entitled, "Ferromagnetic Ferric Oxide," was read by Prof. E. F. HERROUN, F.I.C., and Prof. E. WILSON, M.Inst.C.E., M.I.E.E.

5. A paper entitled, "The Physical Interpretation of Wave Mechanics," was read by G. TEMPLE, Ph.D., 1851 Exhibition Research Student, Imperial College of Science.

6. A demonstration of Emulsions showing Chromatic Effects was given by R. H. HUMPHRY, M.Sc., The Sir John Cass Technical Institute.

December 14, 1928.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following were elected Fellows of the Physical Society: Teresa Joseph Dillon, Frederick Robert Charles Rouse, Robert Constantine Graseby, L. G. Vedy.

The President announced that the Council had elected the following Student Members of the Society: Godfrey Henry Barker, Lionel V. Cole, Arnold Joseph Holland, R. Jessel.

2. A lecture entitled, "A Survey of Heat Conduction Problems," was given by EZER GRIFFITHS, D.Sc., F.R.S., and was followed by a discussion.

January 8, 9 and 10, 1929.

The Nineteenth Annual Exhibition of the Physical Society and the Optical Society was held in the Imperial College of Science.

Discourses were delivered as follows:

January 8th: Prof. F. LLOYD HOPWOOD, D.Sc., F.Inst.P., "Experiments with High-Frequency Sound Waves."

Mr S. R. HUMBY, "Some Experiments with Sound Waves."

January 9th: Mr CONRAD BECK, C.B.E., "Lenses."

Mr S. R. HUMBY, "Some Experiments with Sound Waves."

January 10th: Mr A. J. BULL, M.Sc., F.Inst.P., "Some Colour Problems in Photo-Engraving."

January 25, 1929.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following was elected a Fellow of the Physical Society: Thomas Logie MacDonald.

The President announced that the Council had elected the following a Student Member of the Society: Alastair Watson Gillies.

2. A paper entitled, "A Fused Quartz Pendulum Rod for Clocks," was read by Prof. C. VERNON BOYS, F.R.S.

3. A paper entitled, "A Method for the Determination of the Equivalent Resistance of Air-Condensers at High Frequencies," was read by G. W. SUTTON, B.Sc.

4. A paper entitled, "The Measurement of the Anode Circuit Impedances and Mutual Conductances of Thermionic Valves," was read by L. HARTSHORN, A.R.C.S., B.Sc., D.I.C., The National Physical Laboratory.

February 8, 1929.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following were elected Fellows of the Physical Society: Kenneth Drinkall, Edwin Irving Harrison, Heinrich Richard Ronnebeck, Owen Alfred Saunders, F. J. M. Stratton, Reginald Alfred Fereday, William Singleton, R. W. B. Pearse, William Edward Pretty.

2. A paper entitled, "The Photographic Measurement of the Relative Intensities of the $L\alpha_1$, $L\alpha_2$, $L\alpha_3$ lines of Silver," was read by H. C. WEBSTER, M.Sc., Dixon Research Scholar, Natural Philosophy Laboratory, University of Melbourne.

3. A paper entitled, "Spark Satellites of the $L\alpha$ lines of Silver," was read by H. C. WEBSTER, M.Sc., Dixon Research Scholar, Natural Philosophy Laboratory, University of Melbourne.

4. A demonstration of a new instrument for the rapid and accurate determinations of the specific gravities of solid substances was given by Mr W. A. BENTON, Head of the Research Department, Messrs W. and T. Avery, Ltd.

February 22, 1929.

D. OWEN, B.A., D.Sc., in the Chair.

1. The following was elected a Fellow of the Physical Society: Alfred Charles Hiscocks.

2. A paper entitled, "The Construction and Calibration of a Sensitive Form of Pirani Gauge for the Measurement of High Vacua," was read by L. F. STANLEY, A.R.C.S., B.Sc., Research Student, The Royal College of Science.

3. A paper entitled, "The Free Periods of a Composite Elastic Column or Composite Stretched Wire," was read by CHARLES H. LEES, D.Sc., F.R.S.

4. A paper entitled, "A Capillary Tube Method for the Simultaneous Determination of Surface Tension and of Density," was read by ALLAN FERGUSON, M.A., D.Sc., and J. A. HAKES, B.Sc.

5. A demonstration of a standard electrostatic voltmeter and wattmeter, used for measurements of alternating currents at power frequencies at the National Physical Laboratory, was given by Dr E. H. RAYNER.

March 8, 1929.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following were elected Fellows of the Physical Society: James Allan Hakes, Edgar Isaac Everett, Robert Edward Herrick.

The President announced that the Council had elected the following a Student Member of the Society: Richard Leonard Ascough Borrow.

2. A paper entitled, "The Dependence of the Mobility of Ions in Air on the Relative Humidity," by EZER GRIFFITHS, D.Sc., F.R.S., and J. H. AWBERY, B.A., B.Sc., was read by Dr EZER GRIFFITHS.

3. A paper entitled, "Some Unsolved Problems relating to the Mobilities of Gaseous Ions," was read by Prof. A. M. TYNDALL, D.Sc.

4. The reading of the above papers was followed by a general discussion on the mobility of ions, in which the following took part: Messrs J. H. Awbery, C. F. Powell, S. P. MacCallum, L. G. H. Huxley, D. Owen, J. H. Vincent, F. J. W. Whipple, and (by communication) K. L. Goodall.

Annual General Meeting, March 22, 1929.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The reports of the Council and Hon. Treasurer were presented and adopted.

2. Dr W. JEVONS and Dr E. G. RICHARDSON having been appointed scrutators, the following officers and members of Council were elected unanimously for 1929-1930:

President: W. H. Eccles, D.Sc., F.R.S.

Vice-Presidents (who have filled the office of President): Sir Oliver J. Lodge, D.Sc., F.R.S.; Sir Richard Glazebrook, K.C.B., D.Sc., F.R.S.; Prof. H. L. Callendar, M.A., LL.D., F.R.S.; Sir Arthur Schuster, Ph.D., Sc.D., F.R.S.; Sir J. J. Thomson, O.M., D.Sc., F.R.S.; Prof. C. Vernon Boys, F.R.S.; Prof. C. H. Lees, D.Sc., F.R.S.; Prof. Sir W. H. Bragg, K.B.E., M.A., F.R.S.; Alexander Russell, M.A.,

D.Sc., F.R.S.; F. E. Smith, C.B., C.B.E., D.Sc., F.R.S.; Prof. O. W. Richardson, M.A., D.Sc., F.R.S.

Vice-Presidents: R. W. Paul; J. S. G. Thomas, D.Sc.; Prof. A. O. Rankine, O.B.E., D.Sc.; Prof. F. L. Hopwood, D.Sc.

Hon. Secretaries: Ezer Griffiths, D.Sc., F.R.S.; Allan Ferguson, M.A., D.Sc.

Hon. Foreign Secretary: Prof. O. W. Richardson, M.A., D.Sc., F.R.S.

Hon. Treasurer: R. S. Whipple.

Hon. Librarian: J. H. Brinkworth, M.Sc., A.R.C.S.

Ordinary Members of Council: Miss A. C. Davies, D.Sc.; Prof. A. M. Tyndall, D.Sc.; T. Smith, M.A.; J. Guild, A.R.C.S., D.I.C.; Prof. W. Wilson, Ph.D., D.Sc., F.R.S.; D. Owen, B.A., D.Sc.; Sir Richard Paget, Bart.; Major I. O. Griffith, M.A.; D. W. Dye, D.Sc., F.R.S.; A. B. Wood, D.Sc.

3. Prof. PIETER ZEEMAN was unanimously elected an Honorary Fellow of the Society.

4. A vote of thanks to the honorary auditors, Mr L. Hartshorn and Dr E. H. Rayner, was proposed by Dr J. S. G. THOMAS, seconded by Mr T. SMITH, and carried by acclamation.

5. A vote of thanks to the retiring officers and Council was proposed by Dr S. MARSH and seconded by Dr W. S. TUCKER. It was mentioned that special reference was made to the retirement of Prof. A. O. RANKINE from the post of Hon. Secretary (Business), which he had filled with great advantage to the Society for 5½ years. The vote was carried by acclamation.

6. A vote of thanks to the Governors of the Imperial College of Science, for permitting the Society to use the College buildings, was proposed by Dr D. OWEN, seconded by Mr R. S. WHIPPLE, and carried by acclamation.

Ordinary Meeting following the Annual General Meeting.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following were elected Fellows of the Physical Society: H. J. E. Bailey, G. M. B. Dobson, T. C. Keeley.

2. The Presidential Address was delivered by Dr W. H. ECCLES, F.R.S., who took as his subject: "The New Acoustics."

A vote of thanks to the lecturer was proposed by Prof. F. L. HOPWOOD, seconded by Mr R. W. PAUL, and carried by acclamation.

*Proceedings**April 19, 1929.*

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following was elected a Fellow of the Physical Society: Donald McKerracher.

2. The Duddell Medal for 1928 was presented to Dr C. E. GUILLAUME who, after expressing his thanks, briefly explained some aspects of his work.

3. The Fourteenth Guthrie Lecture was delivered by Prof. P. W. BRIDGMAN, Hollis Professor of Mathematics and Natural Philosophy in Harvard University, on the Properties of the Elements under High Pressures.

A vote of thanks to the lecturer was moved by Sir ROBERT A. HADFIELD, F.R.S., seconded by Prof. A. W. PORTER, F.R.S., and carried by acclamation.

April 26, 1929.

Prof. F. L. HOPWOOD, D.Sc., in the Chair.

1. The following was elected a Fellow of the Physical Society: G. P. Barnard.

2. A discussion on the Teaching of Geometrical Optics was held.

At the close of the discussion Mr T. SMITH suggested that the Council of the Physical Society should be requested to take steps for the appointment of a committee, comprising a small number of representatives of the Society and of appropriate organisations of teachers, for the purpose of giving effect to the conclusions arising out of the discussion. This proposal was agreed to unanimously.

May 10, 1929.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. A paper entitled, "Heaviside's Fractional Differentiator," by W. E. SUMPNER, D.Sc., M.I.E.E., was taken as read in the absence of the author.

2. A paper entitled, "A Simple Method of Fitting a Straight Line to a Series of Observations," was read by J. H. AWBERY, B.A., B.Sc., Physics Department, The National Physical Laboratory.

3. A paper entitled, "Arc Spectra in the Region λ 1600- λ 2100," was read by E. W. H. SELWYN, B.Sc.

4. A paper entitled, "The Spectrum of Trebly-ionised Thallium," was read by K. R. RAO, D.Sc., Imperial College of Science.

5. A paper entitled, "The Elastic Properties of Thick Cylindrical Shells under Internal Pressure," was read by G. A. WEDGWOOD.

6. A demonstration relating to Standards of Length and Mass was given by J. E. SEARS, C.B.E., The National Physical Laboratory.

May 14, 1929.

Meeting held jointly with the Society of Glass Technology at the Research Laboratories of the General Electric Company, Ltd., Wembley.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

The following papers were read:

1. "A Study of the Thermal Expansion of Glass up to the Softening Temperature," by Prof. W. E. S. TURNER, O.B.E., D.Sc., F.Inst.P., and F. WINKS, M.Sc.Tech.

2. "The Measurement of the Viscosity of Glass at High Temperatures by means of the Rotating Cylinder Viscometer," by R. F. PROCTOR, B.Sc., A.M.I.E.E., and R. W. DOUGLAS. (A communication from the Staff of the Research Laboratories of the General Electric Co., Ltd., Wembley.)

3. "The Photo-Elastic Properties of Glass," by F. C. HARRIS, M.Sc., Department of Applied Mathematics, University College, London.

The Research Laboratories of the General Electric Co., Ltd., at Wembley, were inspected by Fellows before the meeting.

After the meeting the Glass Works of the Osram General Electric Company were visited, by courtesy of the Manager, Mr W. WARREN, A.M.I.C.E., A.M.I.E.E.

May 24, 1929.

W. H. ECCLES, D.Sc., F.R.S., in the Chair.

1. The following were elected Fellows of the Physical Society: Philip E. Belas, William Bergin, George William Brindley, Alexander Morris Cassie, James Gerald Crowther, E. J. Evans, Arthur Eric Knowler, Wilfred Llowarch, A. R. Marshall, Kenneth Emerson Pattinson, Harold Norman Pighills, George Gibson Sherratt, William Griffiths Tonner, Frank Andrews Walker.

2. A paper entitled, "A Hygrometer for use in Timber-Seasoning Kilns," was read by EZER GRIFFITHS, D.Sc., F.R.S., Physics Department, National Physical Laboratory, Teddington, Middlesex.

3. A paper entitled, "Experiments on Magnetostrictive Oscillators at Radio Frequencies," was read by J. H. VINCENT, M.A., D.Sc., F.Inst.P.

4. A demonstration of an apparatus for measuring the Thermal Expansion of Glass was given by F. WINKS, M.Sc.Tech.

5. A demonstration of the Flutter of Model Aeroplane Wings was given by W. J. DUNCAN, The National Physical Laboratory.

June 14, 1929.

W. H. ECCLES, D.Sc., F.R.S., and subsequently R. W. PAUL, in the Chair.

1. The following were elected Fellows of the Physical Society: L. F. G. SIMMONS, Parmeshwar Dayal.
2. A paper entitled, "The Zeeman Effect for the Arc Spectrum of Gold," by A. S. M. SYMONS, A.R.C.S., D.I.C., B.Sc., and J. DALEY, A.R.C.S., D.I.C., B.Sc., was taken as read in the absence of the authors.
3. A paper entitled, "The Band Spectrum of Lanthanum Monoxide," preceded by a Note on Electronic Band Spectra of Diatomic Molecules, was read by W. JEVONS, D.Sc., F.Inst.P.
4. A paper entitled, "Pressure Shifts in Line Spectra of Gases," was read by W. E. PRETTY, A.R.C.S., D.I.C., B.Sc., The Imperial College of Science.
5. Exhibits showing the Crystal Structure of Manganese and Aluminium Alloys were shown by G. D. PRESTON, B.A.

June 28, 1929.

1. The following were elected Fellows of the Physical Society: Frederick F. P. BISACRE, M.A., B.Sc., Thomas W. MINETT, B.Sc., Edmund Clifton Stoner.
2. A demonstration of some Contact Devices used in an Apparatus for the Measurement of Electrical Resistance at High Temperatures was given by J. L. HAUGHTON, D.Sc., of the National Physical Laboratory.
3. A paper entitled, "The Relation between Hydrogen Pressure and Filament Resistance in a Tube containing Glowing Tungsten," was read by TERESA J. DILLON, B.Sc., Ph.D., London School of Medicine for Women.
4. A paper entitled, "The Band Systems of Titanium Oxide," was read by FRANCES LOWATER, Ph.D., F.R.A.S.
5. A paper entitled, "The Absolute Measurement of Sound Intensity," was read by F. D. SMITH, M.Sc., Admiralty Research Laboratory, Teddington.

Visit to Birmingham, July 6, 1929.

On arrival at Leamington the visitors drove by motor-bus, provided by the University, to Birmingham via Warwick. At Warwick a stop was made to enable members to inspect Warwick Castle and other places of historic interest. Lunch was served about 1.30 p.m. at the University Refectory in the Edgbaston Buildings, and thereafter the University Science Buildings were open to inspection.

A demonstration was given at 2.30 p.m. in the Mechanical Engineering Department by Prof. F. W. BURSTALL, Vice-Principal of the University.

A Meeting of the Society was held at 3 p.m., Prof. F. L. HOPWOOD being in the Chair. Tea was taken at 4.30 p.m. in the Physics Block, and was followed by demonstrations and an exhibition of apparatus in the Physics Department.

At the meeting the following papers were read in abstract:

"The Magnetic Analysis of Steels," by S. W. J. SMITH, M.A., D.Sc., F.R.S., and A. A. DEE, B.Sc., D.I.C.

"Thermal Diffusion at Low Temperatures," by T. L. IBBS, M.C., Ph.D., and K. E. GREW, B.Sc.

"The Damping of Vibrations in Steel Tuning Forks and its Variation with Temperature," by G. BARLOW, D.Sc., and H. B. KEENE, D.Sc.

"The Crystal Structure of some Carbohydrates," by J. YOUNG, B.Sc., A.R.C.S.

"Note on the Origin of Certain Interatomic Forces," by M. C. JOHNSON, M.A., M.Sc.

The following demonstrations were given:

"A Micro-Hygrometer," by Dr G. A. SHAKESPEAR.

"Rainbow Jets," by Dr G. BARLOW.

"Etch Figures on Single Crystals of Nickel-Iron," by A. A. DEE.

"A Micro-Manometer," by M. C. JOHNSON and G. O. HARRISON.

and in the Mechanical Engineering Department:

(1) "Generation of Screw Threads"; (2) "Air Cooling"; by Prof. F. W. BURSTALL, Vice-Principal.

Some examples of the equipment of the Physical Laboratories for teaching purposes were shown also.

On behalf of the visitors a hearty vote of thanks to Prof. S. W. J. SMITH and his colleagues and to the University authorities was proposed by Dr J. H. VINCENT and carried by acclamation.

REPORT OF THE COUNCIL FOR THE YEAR 1928

Meetings

DURING the year fourteen Ordinary Science Meetings were held at the Imperial College of Science. At these meetings 33 Papers were presented and 10 Demonstrations given. By the kind invitation of Prof. Tyndall about 75 Members of the Society and their friends visited Bristol on July 7. The new University buildings were open for inspection and a Science Meeting was held in the Henry Herbert Wills Physical Laboratory, when several papers were read and demonstrations given by workers in the Laboratory.

Prof. Sir Joseph Thomson, O.M., F.R.S., delivered the Thirteenth Guthrie Lecture on March 9, the subject being "Electrodeless Discharges through Gases." About 280 Fellows and Visitors were present.

On December 14 Dr Ezer Griffiths, F.R.S., gave a lecture entitled "A Survey of Heat Conduction Problems."

The average attendance at meetings of the Society was 67.

Eighteenth Annual Exhibition

The Eighteenth Annual Exhibition, arranged jointly by the Physical and Optical Societies, was held, through the courtesy of the Governing Body, at the Imperial College on January 10, 11 and 12. Trade exhibits were arranged by eighty-one firms, and the Research and Experimental Section contained exhibits contributed from twenty-three sources. Discourses were given by Mr A. Whitaker on "Progress in the Recording and Reproduction of Sound"; by Mr V. E. A. Pullin on "Recent Applications of X-rays"; and by Dr J. W. T. Walsh on "Artificial Daylight." On the third day the general public were admitted, and on the morning of January 11 a new special session was instituted, limited to members of the Physical and Optical Societies. The total attendance at the Exhibition was estimated at about 5000.

Officers

During the early part of the year the Librarian, Mr J. H. Brinkworth, acted also as Business Secretary while Prof. A. O. Rankine was absent in Persia. Shortly after the Annual General Meeting on March 23 the Council received and accepted with much regret Mr J. Guild's resignation as Papers Secretary, placing on record their appreciation of his long and valuable services. Dr Allan Ferguson was appointed to succeed Mr Guild.

Representatives on Other Bodies

Dr J. H. Vincent and Dr A. Ferguson have been appointed as representatives of the Society on the Board of the Institute of Physics; and Dr D. Owen and Dr A. Ferguson on the Science Abstracts Committee. Mr J. H. Brinkworth and Prof. A. O. Rankine have been appointed as representatives of the Society on a Joint Library Committee with the Institute of Physics and the Optical Society with a view to establishing a Physics Library at 1 Lowther Gardens.

Prof. A. O. Rankine represented the Society at the Centenary celebrations of the Institution of Civil Engineers in June and presented an address of congratulation on behalf of the Society. Prof. C. G. Darwin was the delegate of the Society at the Bologna meeting of the International Congress of Mathematicians in September.

Honorary Fellow

At the Annual General Meeting on March 23 Prof. Albert Einstein was unanimously elected an Honorary Fellow of the Society.

Award of the Duddell Medal

At the Annual General Meeting the Fifth (1927) Duddell Medal was presented to Dr F. E. Smith, F.R.S. The Council has awarded the Sixth (1928) Duddell Medal to Dr C. E. Guillaume, Honorary Fellow of the Society. The date of presentation is expected to be April 19, 1929.

Fellows of Long Standing. Remission of Subscriptions

On January 27 the Council passed unanimously the following resolution:

“Any Fellow having reached the age of 65, and having retired from the practice of his profession or business, may apply to the Council to remit or reduce his future annual subscriptions, provided his Fellowship of the Society has been continuous for at least 25 years. If his request be granted, he may nevertheless be required to pay, at a rate to be determined by the Council from time to time, for such publications of the Society as he may wish to receive.”

In order to enable the Council to act upon this resolution an amendment was proposed to the Articles of Association which was duly adopted at Special General Meetings held on May 25 and June 8. Article 37 was thus amended by the addition of the words, “The Council may, however, in its discretion, reduce or remit the subscription of any individual Fellow, in special circumstances.”

Gifts to the Society

The Council is indebted to Mr R. W. Paul for the gift of five bookcases for the Society's library, for use at 1 Lowther Gardens.

During the year the Council received a gift of about 100 parts of the Proceedings from Mr A. P. Trotter. These have been used as far as possible to institute a retrospective exchange back to 1899 with the Académie Royale de Belgique.

New Publishing Arrangements

As intimated in the last Annual Report the Cambridge University Press commenced printing the Proceedings and other publications of the Society in October, in relation to Volume 41. The fact that the Cambridge University Press did not wish to act as publishers necessitated a modification of the arrangement with the Institute of Physics referred to in the last Report. According to the new arrangement which the Council has made, the Institute has undertaken the publication of the Proceedings of the Society from 1 Lowther Gardens, and Mr Thomas Martin, the Secretary of the Institute, has been appointed Assistant Secretary of the Physical Society. Capt. C. W. Hume's title has accordingly been changed to Assistant Secretary (Editing).

As a result of the labours of the Publications Sub-committee, which completed its work and was dissolved on June 22, several important changes have been introduced which have resulted in speeding up publication, improving its production and reducing its net cost. The changes made involve the introduction of suitable advertisements and

Report of the Council for 1928

reviews into the Proceedings, and the issue of the Bulletin in a duplicate form whereby on the one hand the issue of notices of meetings takes place more promptly, and on the other hand discussions of papers are recorded more accurately.

Obituary

The Council records with deep regret the deaths of two Honorary Fellows, Prof. H. A. Lorentz and Prof. Willy Wien. Prof. Lorentz was the senior Honorary Fellow, having been elected in 1902. Prof. Wien was elected in 1925, and delivered the Guthrie Lecture in the same year. The Society has sustained another great loss in the death of Dr C. Chree, who was elected in 1896 and was President in 1908-10.

Other losses by death which the Council has with regret to record are: Rev. C. W. Bourne (elected 1874 during the first session of the Society), Mr A. Siemens (elected 1899), Mr W. H. Sodeau (elected 1896), Mr W. B. Croft (elected 1890 and served later on Council), Mr F. W. Shurlock (elected 1895), Mr H. Davey (elected 1891), Mr R. E. Day (elected 1875), Sir Horace Darwin (elected 1898), Mr W. Claude Johnson (elected 1889), all Life Fellows of the Society; also Mr H. Morris Airey (elected 1911).

Membership Roll

The number of Honorary Fellows on the Roll on December 31, 1928 was 10. At the same date Ordinary Fellows numbered 690 and Students 47.

The changes in the membership of the Society during the year are shown in the appended table:

	Total Dec. 31, 1927	Changes during 1928	Total Dec. 31, 1928
<i>Honorary Fellows</i>	11	Elected 1 Deceased 2 Net decrease 1	10
<i>Ordinary Fellows</i>	680	Elected 22 Student transfers 5 27 Deceased 11 Resigned or lapsed 6 17 Net increase 10	690
<i>Students</i> ...	27	Elected 25 Trans. to Fellow 5 Net increase 20	47
<i>Total Membership</i>	718	Net increase 29	747

REPORT OF THE HON. TREASURER

THE Income for the year 1928 exceeded the Expenditure by £98. 3s. 7d.

The Society has not received any remission of taxes on its investment income for the years 1926 and 1927. The Council of the British Association is greatly assisting the various scientific societies in connection with their claims for refund of income tax on investment dividends; and it is hoped that on a future occasion it will be possible to report that the taxes have been refunded.

The Cambridge University Press being unable to undertake the work connected with the publication of the *Proceedings* and other publications of the Society, it was decided that, with the help of the Institute of Physics, the Society would act as its own publisher. A new financial arrangement was therefore provisionally made with the Institute, dating from April 1st, 1928.

The Society desires to thank the Council of the Royal Society for a grant of £150 towards the cost of its publications. This has enabled the Society to reprint one of the numbers of its *Proceedings*, and to put in hand the publication of a special report.

A legacy of £4. 14s. 6d. (£5. 5s. 0d. less probate duty) was received in February, 1928, from the Executors of the late Mr W. H. Gray.

The sum of £100 was invested in 5 % War Loan Stock 1929/47 in June, 1928.

The investments have been valued at market prices through the courtesy of the Manager of the Charing Cross Branch of the Westminster Bank.

(Signed) ROBERT S. WHIPPLE
Honorary Treasurer.

March 5th, 1929

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER, 1928

<i>1927</i>	<i>£</i>	<i>s.</i>	<i>d.</i>	<i>T_o</i>	<i>EXPENDITURE</i>			<i>£</i>	<i>s.</i>	<i>d.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>	<i>T_f</i>	<i>1928</i>
	400	0	0	0	Stock of Publications at 1st January, 1928			500	0	0					
	475	0	0	0	"Science Abstracts"			535	0	0					
	922	0	8	0	Ordinary Publications:										
	73	15	4	0	"Proceedings"		959	8	0						
	101	17	3	0	"Bulletin"		61	14	9						
					General		93	17	2						
	188	12	7	0	Reprinting Parts of "Proceedings"					1114	19	11			
	105	0	10	0	Postage on Publications		52	5	9						
	61	8	5	0	Reporting at Meetings		103	2	7						
	33	15	2	0	Expenses at Meetings		62	3	6						
	485	15	10	0	Exhibition Expenses		32	3	1						
	10	4	5	0	Optical Society Exhibition Account		576	13	5						
							45	12	6						
	5	0	0	0	Periodicals and Library					622	5	11			
	112	10	0	0	Administration Expenses:					13	10	10			
	100	8	7	0	Institute of Physics		104	14	8						
					Office Expenses		100	18	0						
	20	0	0	0	Special Expenses on transfer of Publishing					205	12	8			
					Guthrie Lecture (Honorarium)		96	6	1						
	384	15	0	0	Bristol Meeting; Railway Expenses		20	0	0						
	26	13	6	0	Expenses of Eclipse Excursion		47	3	9						
	255	11	7	0	Expenses of Delegates to Volta Congress and Fresnel Centenary										
					A. W. Scott Bequest: Purchase of £250										
	29	14	8	0	Balance being excess of Income over Ex- penditure carried to Accumulated Fund					98	3	7			
	£3792	3	10								£3502	17	8		

* Seventy-seven Fellows paid reduced subscriptions by the arrangement with the Institute of Physics, the total rebate amounting to £27. 10s. 4d.

BALANCE SHEET AT 31ST DECEMBER, 1928

LIABILITIES

<i>Accumulated Fund:</i>	£	s.	d.	£	s.	d.
Balance as per last Account	1996	1	7			
Entrance Fees, 1928	18	18	0			
	2014	19	7			
	18	14	0			
	98	3	7	2131	17	2
<i>Add Increased value of Investments</i>						
Excess of Income over Expenditure, 1928				2289	10	0
<i>Life Compositions:</i>						
As per last Balance Sheet						
<i>Duddell Memorial Trust Fund:</i>						
As per last Balance Sheet	480	12	9			
<i>Add Increased value of Investments</i>	7	0	0	487	12	9
<i>W. F. Stanley Trust Fund (For the "Bulletin"):</i>						
As per last Balance Sheet	386	0	0			
Less Decreased value of Investments	25	0	0	361	0	0

<i>A. W. Scott Bequest</i>				250	0	0
<i>Sundry Creditors</i>				536	4	11
<i>Subscriptions paid in Advance</i>				48	7	8

£6054 12 6

ASSETS

<i>Investments at Market Value on date:</i>	£	s.	d.	£	s.	d.
£399 London Midland and Scottish Railway 4 % Debenture Stock	328	0	0			
£1000 London Midland and Scottish Railway 4 % Preference Stock	730	0	0			
£200 Metropolitan Board of Works 3½ % Stock	198	0	0			
£400 Lancaster Corporation 3 % Redeemable Stock	284	0	0			
£254. 2s. 9d. New South Wales 5 % Stock 1935/55	250	0	0			
£300 Southern Railway Preferred Ordinary Stock	225	0	0			
£442 Southern Railway Deferred Ordinary Stock	136	0	0			
£500 London and North Eastern Railway 4 % Debenture Stock	390	0	0			
£500 India 3½ % Stock	350	0	0			
£650 4 % Funding Loan 1960/90	585	0	0			
£650 5 % War Loan 1929/47 Inscribed "A" Account	668	0	0			
£400 5 % War Loan 1929/47 Inscribed "B" Account	411	0	0			
£150 Southern Railway 5 % Debenture Stock	148	0	0			

Stock of Publications (as per Treasurer's Valuation)

<i>Subscriptions due</i>				4703	0	0
<i>Sundry Debtors</i>				500	0	0
Inland Revenue—Income Tax reclaimed for 1926				46	4	0
<i>Cash at Bank:</i>				40	3	0
On Deposit Account	500	0	0	27	10	10
" Current Account	230	6	10			
<i>Cash in Hand</i>	7	7	10			

737 14 8
£6054 12 6

ROBERT S. WHIPPLE, *Honorary Treasurer.*

We have audited the above Balance Sheet and have obtained all the information and explanations we have required. We have verified the Bank Balances and the Investments. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Society's affairs according to the best of our information and the explanations given to us and as shown by the books of the Society.

SPENCER HOUSE, E.C. 2
22nd February, 1929.

KNOX, CROPPER & CO.,
Chartered Accountants.

Examined and approved on behalf of the Society

(Signed) L. HARTSHORN.
(Signed) E. H. RAYNER.

LIFE COMPOSITION FUND AT DECEMBER 31ST, 1928

	£	s.	d.
128 Fellows paid £10	.	.	.
3 Fellows paid £15	.	.	.
1 Fellow paid £20	.	.	.
1 Fellow paid £20. 10s.	.	.	.
14 Fellows paid £21	.	.	.
20 Fellows paid £31. 10s.	.	.	.
167	£	2289	10 0

W. F. STANLEY TRUST FUND (FOR THE "BULLETIN").

	£	s.	d.		£	s.	d.
£300 Southern Railway Preferred Ordinary Stock	225	0	0	Carried to Balance Sheet,	.	.	.
£442 Southern Railway Deferred Ordinary Stock	136	0	0		.	.	.
	£361	0	0		£361	0	0

DUDDLE MEMORIAL TRUST FUND.

CAPITAL.							
£	s.	d.		£	s.	d.	
£400 War Loan 5 % 1929/47	411	0	0	Carried to Balance Sheet,	.	.	.
Inscribed Stock	.	.	.		£411	0	0
REVENUE.							
£	s.	d.		£	s.	d.	
Balance at 31st December, 1927	26	12	9	Honorarium to Medallist	.	.	.
Dividends	20	0	0	Balance carried to Balance Sheet	.	.	.
	£46	12	9		£46	12	9